

Orchard Research Center Orchard, Ada Co., Idaho



The Orchard Research Center was established in 1988 to accommodate studies on development of native and introduced plant materials and seeding techniques for greenstripping and range rehabilitation. Research from 1988 through the mid 1990s was sponsored by the USDI Bureau of Land Management and was conducted by the USDA FS Rocky Mountain Research Station, Provo, UT; the USDA NRCS, Idaho State Office, Boise, ID and Aberdeen Plant Materials Center, Aberdeen, ID; and the USDA ARS Forage and Range Research Laboratory, Logan, UT. Subsequent research, also sponsored by the USDI Bureau of Land Management, examined seedbed ecology of cheatgrass and revegetation species (USDA ARS, Boise, ID); rush skeletonweed (*Chondrilla juncea*) ecology, native forb genetics, forb/cheatgrass interactions, sagebrush seedling establishment and sagebrush genetics (USDA FS Rocky Mountain Research Station, Boise, ID, and Provo, UT), and establishment of a revegetation species Display Nursery (USDA NRCS Boise and Aberdeen, ID).

Orchard Research Center site information:

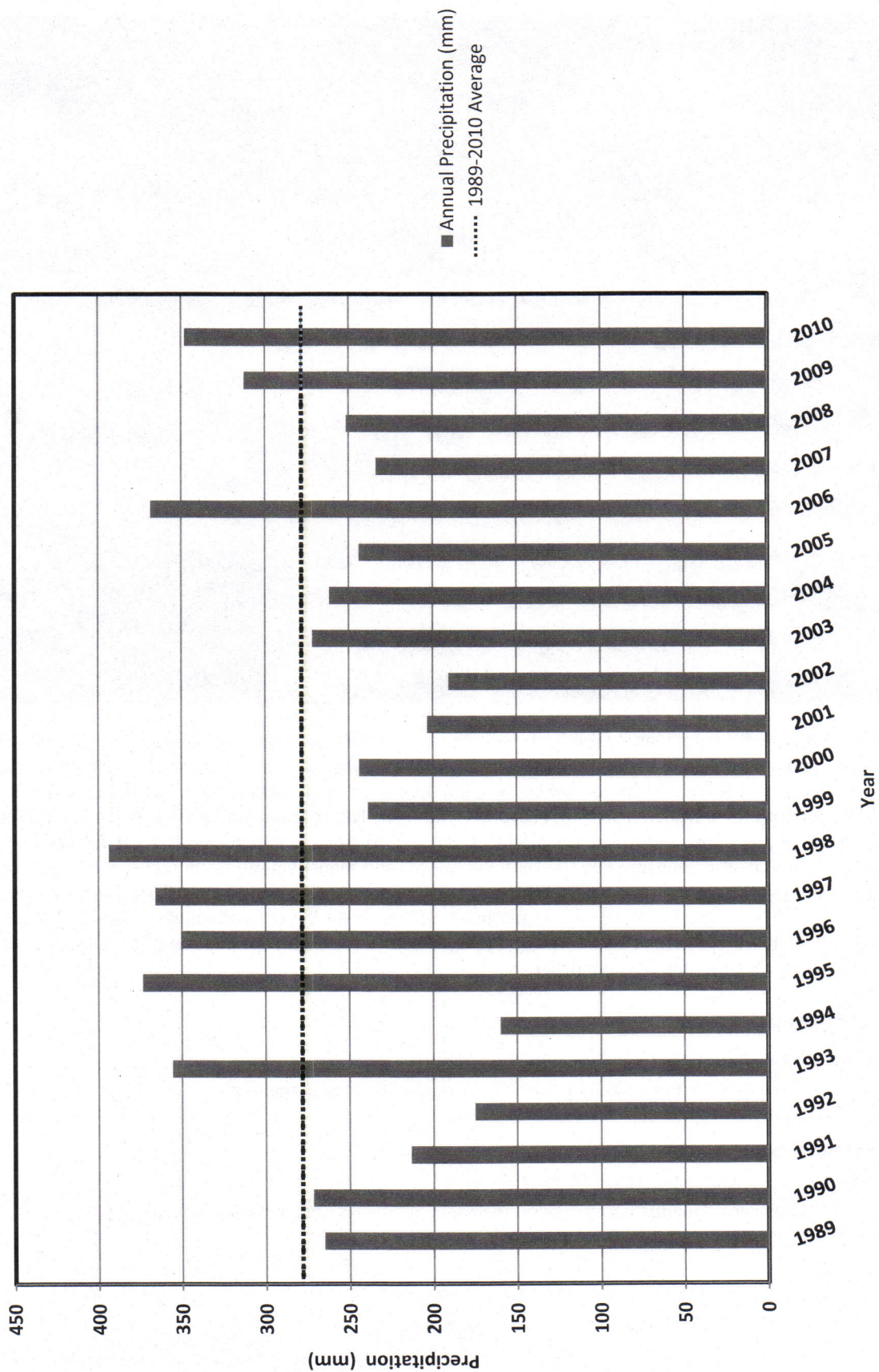
- Location - near former site of Orchard, Ada Co., Idaho
- Size - 97 ha isolated tract managed by the USDI Bureau of Land Management
- Elevation - 975 m
- Annual precipitation - 270 mm
- Ecological Site - Loamy 8-12 ARTRW8/PSSPS-ACTH7
- Soils - Lankbush and Lankbush-Tindahay sandy loams (80%) and Chilcott Brent silt loam (20%).



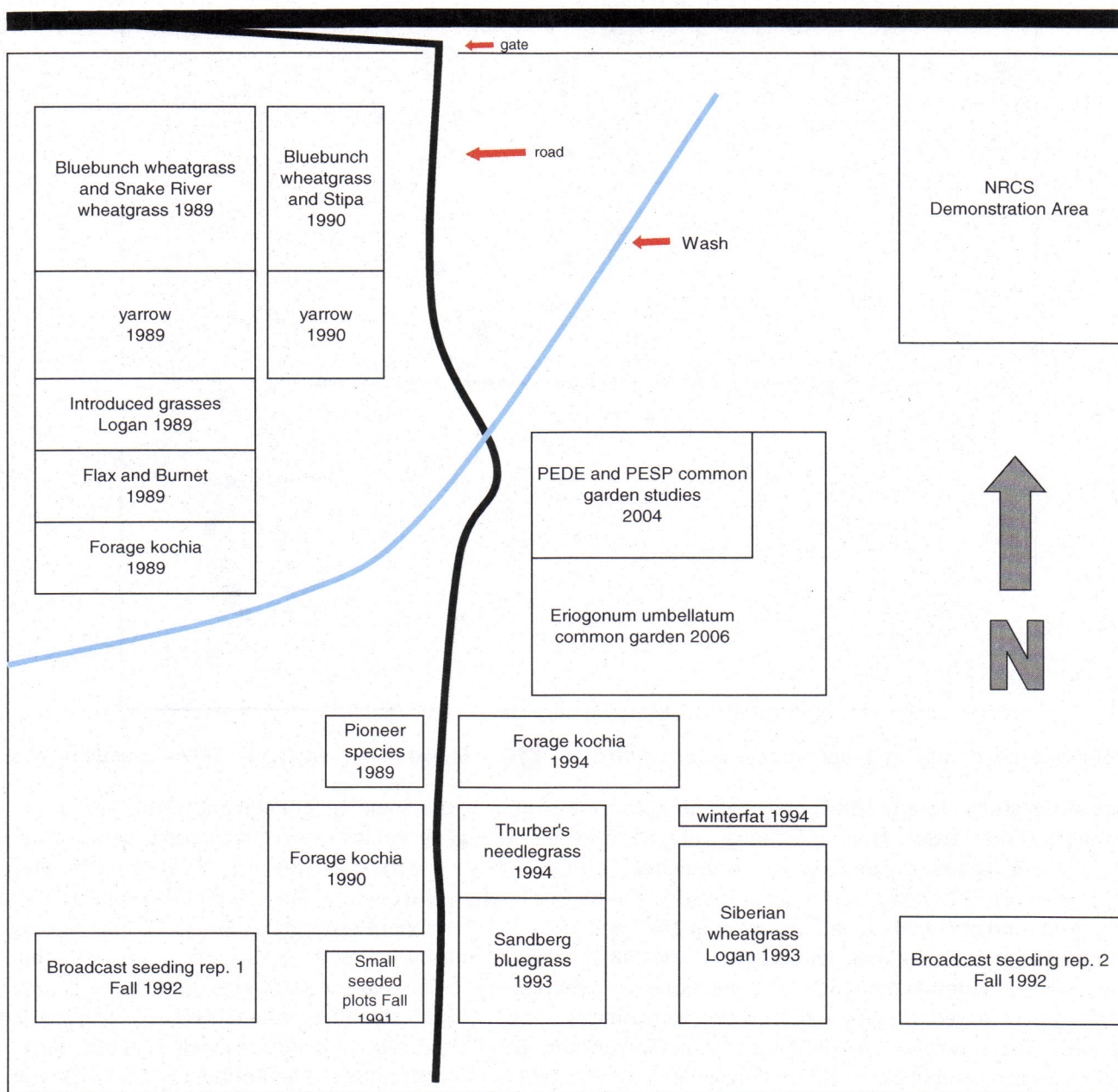
Rocky Mountain Research Station



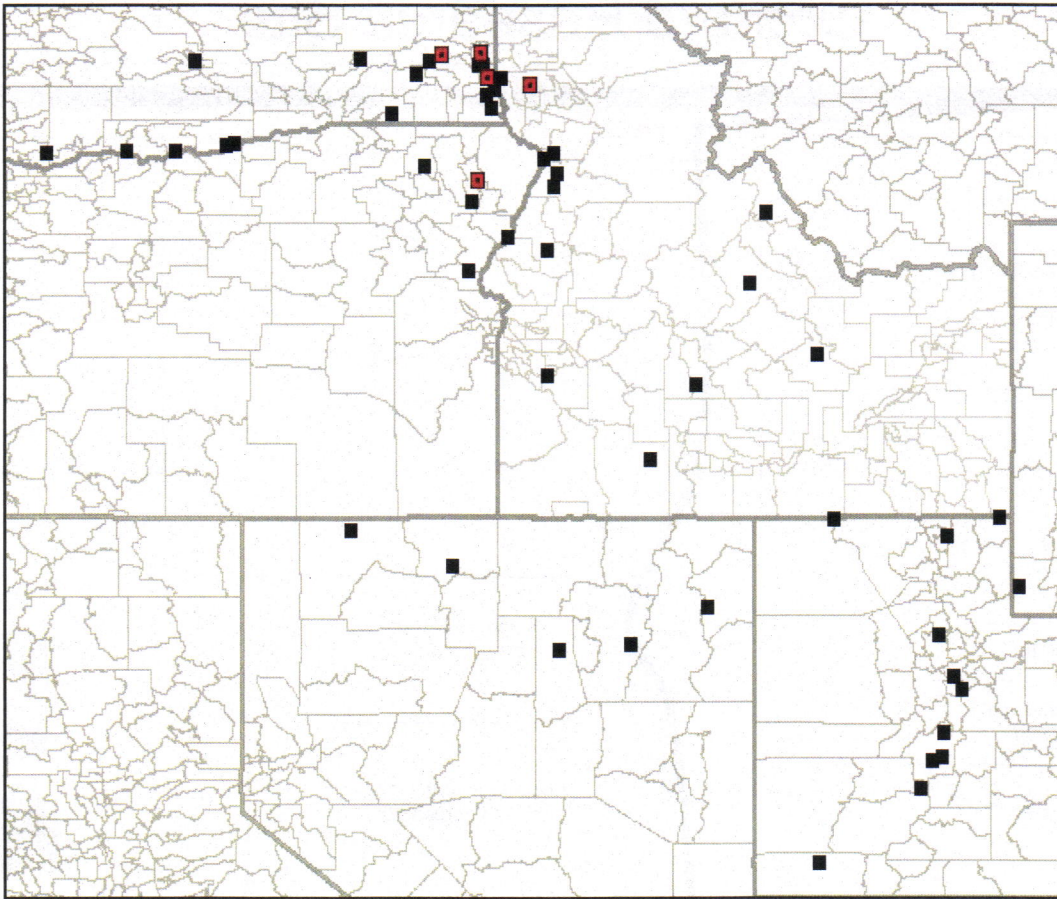
Orchard Precipitation 1989-2010



Orchard Research Site



**Bluebunch Wheatgrass (*Pseudoroegneria spicata*)
and Snake River Wheatgrass (*Elymus wawawaiensis*)**



Bluebunch wheatgrass (*Pseudoroegneria spicata*)
 Snake River wheatgrass (*Elymus wawawaiensis*)

Objectives of the study were to select materials for appropriate areas in the Snake River Plain and shrub steppe communities in central Utah. Thus collections were made from a wide geographic area and included several accessions of Snake River wheatgrass, which had only recently been recognized as a separate species from bluebunch wheatgrass. Common gardens of 53 bluebunch wheatgrass and Snake River wheatgrass accessions were established at the Orchard Research Center and at Nephi in Juab Co., Utah in 1989 and 1990. Plantings were replicated plots (3 or 4 per accession) of 24 greenhouse grown seedlings per accession. The cultivars 'Secar' Snake River wheatgrass and "Goldar" bluebunch wheatgrass were included in the study. All collections were monitored for survival, growth rates, and vigor through 1995. Performance based on the monitored characteristics was similar for Snake River wheatgrass accessions B79 Wawawai, WA; B51 Enterprise, OR; B82 Penawawa Canyon, OR; B66 Colton, WA; and Secar as well as bluebunch wheatgrass accessions B68 Baker, OR; B49 Brownlee Dam, ID; B83 Colton, WA; B52 Grand Ronde, OR; B53 Anatone, WA; and B67 Lewiston, ID. Survival of these accessions remained high through 2005 when last evaluated; spread from seed has occurred in some plots.

Products:

Kitchen, S. G.; Monsen, S. B. 1994. Germination rate and emergence success in bluebunch wheatgrass. *Journal of Range Management*. 47: 145-150.

Monsen, S. B.; Kitchen, S. G.; Memmott, K.; Shaw, N.; Pellant, M.; Young, S.; Ogle, D.; St. John, L. 2003. Notice to release Anatone germplasm bluebunch wheatgrass (selected class natural population). Provo, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 10 p. (Stock seed maintained by the USDA NRCS Aberdeen Plant Materials Center, Aberdeen, ID).

**Bluebunch Wheatgrass (*Pseudoroegneria spicata*, PSSP6) and Snake River Wheatgrass (*Elymus wawawaiensis*, ELWA2)*
Orchard Research Center 1989**

Origin	Accession	Plot nos.	Plants/accession (3 plots of 24 seedlings planted spring 1989)	
			Summer 1989	Summer 2005
Secar, Nez Perce Co., ID	ELWA2 B24**	107, 712, 104	14	24
Goldar, Asotin Co., WA	B25	305, 1011, 1206	11	5
Birds of Prey NCA; Ada Co., ID	B26	112, 903, 1510	3	0
Crows Nest, Idaho Co., ID	B27	209, 809, 1107	10	7
Yuba Dam, Juab Co., UT	B28	207, 806, 1108	7	1
Provo, Utah Co., UT	B29	303, 1009, 1209	6	2
Salt Lake City, Salt Lake Co., UT	B30	108, 911, 1204	12	3
Lindon, Utah Co., UT	B31	212, 907, 1507	5	5
Hyde Park, Cache Co., UT	B32	411, 812, 1412	4	9
Mono, Juab Co., UT	B33	507, 810, 1303	11	2
Levan, Juab Co., UT	B34	402, 803, 1508	15	9
Frisco, Beaver Co., UT	B36	202, 1010, 1211	9	0
Paradise Valley, Humbolt Co., NV	B40	104, 807, 1109	4	0
Denio, Humbolt Co., NV	B41	406, 705, 1103	7	6
Immigrant Pass, Eureka Co., NV	B42	203, 802, 1403	6	2
Lamoille Canyon, Elko Co., NV	B43	509, 709, 1405	8	4
Pequop Summit, Elko Co., NV	B44	511, 909, 1309	1	1
Snowville, Box Elder Co., UT	B45	405, 502, 1045	12	5
Pittsburg Landing, Idaho Co., ID	B46	307, 910, 1111	4	2
Pittsburg Landing, Idaho Co., ID	B47	103, 912, 1210	4	1
Council, Adams Co., ID	B48	408, 908, 1404	10	3
Brownlee Dam, Washington Co., ID	B49	312, 805, 1408	5	2
Wallowa Mountains, Wallowa Co., OR	B50	309, 710, 1512	7	3
Enterprise, Wallowa Co., OR	ELWA2 B51**	401, 608, 1212	18	29
Grand Ronde River, Union Co., OR	B52**	403, 607, 1305	11	18
Anatone, Asotin Co., WA	B53	211, 609, 1401	11	24
Asotin, Asotin Co., WA	B54	206, 904, 1202	17	10
Lewiston, Washington Co., WA	B55	102, 801, 1106	12	7
Salmon, Lemhi Co., ID	B57	110, 610, 1306	10	10

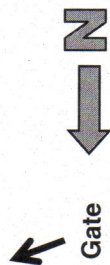
Origin	Accession	Plot nos.	Plants/accession (3 plots of 24 seedlings planted spring 1989)	
			Summer 1989	Summer 2005
Grandview Canyon, Custer Co., ID	B58	301, 601, 1311	5	0
Arco, Butte Co., ID	B59	204, 1008, 1207	5	0
Evanston, Uinta Co., WY	B60	407, 906, 1308	4	3
Dingle, Bear Lake Co., ID	B61	208, 1012, 1208	13	4
Yuba Dam 2, Juab Co., UT	B62	404, 501, 1301	9	1
Fairfield, Camas Co., ID	B63	510, 901, 1411	6	0
Riggins, Idaho Co., ID	B64	106, 1007, 1203	11	5
Riggins 2, Idaho Co., ID	B65	205, 1006, 1509	7	2
Colton, Whitman Co., WA	ELWA2 B66**	409, 606, 1304	13	31
Colton 2, Whitman Co., WA	B67**	512, 804, 1302	11	26
Baker, Baker Co., OR	B68**	310, 612, 1402	11	17
Meeker, Rio Blanco Co., CO	B71	508, 811, 1310	6	0
Marshall, Klickitat Co., WA	B72	412, 708, 1511	9	3
Roosevelt, Klickitat Co., WA	B73	304, 1005, 1205	12	2
Roosevelt 2, Klickitat Co., WA	B74	410, 605, 1003	11	15
Walla Walla- leafy, Walla Walla Co., WA	B75	306, 701, 1201	7	11
Dodge, Garfield Co., WA	B76	308, 905, 1110	14	11
Pataha, Garfield Co., WA	B77	302, 604, 1307	12	8
Wawawai, Whitman Co., WA	ELWA2 B79**	105, 711, 1104	15	23
Conell, Franklin Co., WA	B80	201, 602, 1002	9	6
Livingston, Clark Co., WA	B81	210, 111, 706	11	7
Penawawa Canyon, Whitman Co., WA	ELWA2 B82**	109, 704, 1102	19	17
Colton, Whitman Co., WA	B83**	311, 611, 1312	11	17
Yakima, Yakima Co., WA	B84	101, 603, 1001	5	4

*Bold print distinguishes Snake River wheatgrass (*Elymus wawawaiensis*) accessions.

**Accessions receiving similar high index values in 1995 based on survival, growth, and vigor.

**Bluebunch Wheatgrass (*Pseudoroegneria spicata*, PSSP6)
and Snake River Wheatgrass (*Elymus wawawaiensis*, ELWA2)***

Orchard Research Center 1989



Column*

N. Fence
Row*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
01	PSSP6 B 84	PSSP6 B 80	PSSP6 B 58	ELWA2 B 51	PSSP6 B 62	PSSP6 B 58	PSSP6 B 75	PSSP6 B 55	PSSP6 B 63	PSSP6 B 84	POCO U 9	PSSP6 B 75	PSSP6 B 62	PSSP6 B 53	
02	PSSP6 B 55	PSSP6 B 36	PSSP6 B 77	PSSP6 B 34	PSSP6 B 45	PSSP6 B 80	ELsp C. R.	PSSP6 B 42	PSSP6 B 81	PSSP6 B 80	ELWA2 B 82	PSSP6 B 54	PSSP6 B 67	PSSP6 B 68	
03	PSSP6 B 47	PSSP6 B 42	PSSP6 B 29	PSSP6 B 52	ELsp C. R.	PSSP6 B 84	POCO U 9	PSSP6 B 34	PSSP6 B 26	PSSP6 B 74	PSSP6 B 41	PSSP6 B 64	PSSP6 B 33	PSSP6 B 42	
04	PSSP6 B 40	PSSP6 B 59	PSSP6 B 73	PSSP6 B 62	POCO U 9	PSSP6 B 77	ELWA2 B 82	PSSP6 B 67	PSSP6 B 54	PSSP6 B 45	ELWA2 B 79	PSSP6 B 30	ELWA2 B 66	PSSP6 B 48	
05	ELWA2 B 79	PSSP6 B 65	PSSP6 B 25	PSSP6 B 45	FAPA B 1	PSSP6 B 74	PSSP6 B 41	PSSP6 B 49	PSSP6 B 76	PSSP6 B 73	FAPA B 1	PSSP6 B 73	PSSP6 B 52	PSSP6 B 43	
06	PSSP6 B 64	PSSP6 B 54	PSSP6 B 75	PSSP6 B 41	ELLA B 1	ELWA2 B 66	PSSP6 B 81	PSSP6 B 28	PSSP6 B 60	PSSP6 B 65	PSSP6 B 55	PSSP6 B 25	PSSP6 B 57	ELWA2 B 24	
07	ELWA2 B 24	PSSP6 B 28	PSSP6 B 46	PSSP6 B 60	PSSP6 B 33	PSSP6 B 52	FAPA B 1	PSSP6 B 40	PSSP6 B 31	PSSP6 B 64	PSSP6 B 27	PSSP6 B 59	PSSP6 B 77	ELLA B 1	PSSP6 B 31
08	PSSP6 B 30	PSSP6 B 61	PSSP6 B 76	PSSP6 B 48	PSSP6 B 71	ELWA2 B 51	PSSP6 B 72	ELLA B 1	PSSP6 B 48	PSSP6 B 59	PSSP6 B 28	PSSP6 B 61	PSSP6 B 60	PSSP6 B 49	PSSP6 B 34
09	ELWA2 B 82	PSSP6 B 27	PSSP6 B 50	ELWA2 B 66	PSSP6 B 43	PSSP6 B 53	PSSP6 B 43	PSSP6 B 27	PSSP6 B 44	PSSP6 B 29	PSSP6 B 40	PSSP6 B 29	PSSP6 B 44	ELsp C. R.	PSSP6 B 65
10	PSSP6 B 57	PSSP6 B 81	PSSP6 B 68	PSSP6 B 74	PSSP6 B 63	PSSP6 B 57	PSSP6 B 50	PSSP6 B 33	PSSP6 B 46	PSSP6 B 36	PSSP6 B 76	PSSP6 B 47	PSSP6 B 71	PSSP6 B 81	PSSP6 B 26
11	PSSP6 B 81	PSSP6 B 53	PSSP6 B 83	PSSP6 B 32	PSSP6 B 44	PSSP6 B 83	ELWA2 B 79	PSSP6 B 71	PSSP6 B 30	PSSP6 B 25	PSSP6 B 46	PSSP6 B 36	PSSP6 B 58	PSSP6 B 63	PSSP6 B 72
12	PSSP6 B 26	PSSP6 B 31	PSSP6 B 49	PSSP6 B 72	PSSP6 B 67	PSSP6 B 68	ELWA2 B 24	PSSP6 B 32	PSSP6 B 47	PSSP6 B 61	PSSP6 B 30	ELWA2 B 51	PSSP6 B 83	PSSP6 B 32	PSSP6 B 50

*Plot number = column no., row no.

plots flagged for June 2011 field day

Thurber Needlegrass (*Achnatherum thurberianum*)

Thurber needlegrass is a common understory species of drier Wyoming big sagebrush stands. Although the species could be widely used on for post-fire seedings or other disturbances in these communities, seed is rarely harvested from wildland stands and only small quantities are grown under cultivation. Collections made primarily from the Snake River Plain were included in 1990 and 1994 common gardens at Orchard and near Nephi, Juab Co., Utah. An accession from the Orchard area was selected for seed increase and has been grown commercially, though in limited quantities. Other accessions from eastern Oregon and Washington are grown occasionally. Poor stand establishment and low yields leading to high seed prices have hindered production of the species. Cultural practices to improve stand establishment in agricultural settings are currently being examined by the Oregon State University Malheur Experiment Station, Ontario, Oregon (<http://www.cropinfo.net/AnnualReports/2009/NativePlantEmergence2009.htm>).

Products:

Kitchen, S. G.; Stevens, R.; Wilson, G. R. 1998. Addition of *Achnatherum thurberianum* – Thurber needlegrass to the Rules. Seed Technologist Newsletter. 72: 144-148.

Western Yarrow (*Achillea millefolium occidentale*)

Common gardens of Western yarrow and a number of Eurasian yarrow species were established to evaluate their potential use as greenstripping species and in seeding mixes for big sagebrush communities. Yarrows remain green until midsummer, they are competitive with cheatgrass, and they are generally easy to establish from seed. Burning trials demonstrated that dry leafy material, seed stalks and seed heads were highly flammable. Thus the lower growing *Achillea asiatica* which spread vegetatively and controlled weeds was considered a potential greenstripping species. The Eagle accession of Western yarrow was increased for commercial use as a native forb suitable for inclusion in seeding mixes designed for Wyoming big sagebrush as well as more mesic communities.

Product:

Notice of release for Eagle Germplasm Western Yarrow (Selected germplasm, natural track)
U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 7 p. (Stock seed maintained by the Utah Crop Improvement Association, Logan, UT). Submitted June 2011.

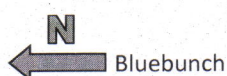
Thurber Needlegrass (*Achnatherum thurberianum*, ACTH7), Bluebunch Wheatgrass (*Pseudoroegneria spicata*, PSSP6) and Needle and Thread (*Hesperostipa comata*, HECO26)
Orchard Research Center 1990



	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740
1	PSSP6 B 109	PSSP6 91	PSSP6 B 101	PSSP6 B 110	PSSP6 B 89	PSSP6 B 109	PSSP6 B 70	ACTH7 B 3	PSSP6 B 115	ACTH7 B 2	ACTH7 B 3	PSSP6 B 88	PSSP6 B 109	ACTH7 B 1	PSSP6 B 89
2	ACTH7 B 3	PSSP6 116	PSSP6 B 1	PSSP6 B 111	PSSP6 B 70	ACTH7 B 1	PSSP6 B 108	PSSP6 B 104	PSSP6 B 116	PSSP6 B 103	ACTH7 B 2	PSSP6 B 110	PSSP6 B 116	PSSP6 B 104	PSSP6 B 108
3	PSSP6 B 104	PSSP6 102	PSSP6 B 103	PSSP6 B 114	PSSP6 B 93	PSSP6 B 56	PSSP6 B 107	ACTH7 B 4	PSSP6 B 101	PSSP6 B 102	PSSP6 B 107	PSSP6 B 114	PSSP6 B 56	PSSP6 B 93	PSSP6 B 70
4	PSSP6 B 90	PSSP6 86	PSSP6 B 115	PSSP6 B 2	PSSP6 B 88	PSSP6 B 89	PSSP6 B 114	HECO26 B 8	PSSP6 B 91	PSSP6 B 111	PSSP6 B 91	HECO26 B 8	PSSP6 B 86	PSSP6 B 90	PSSP6 B 115
5	PSSP6 B 107	HECO26 B 8	ACTH7 B 4	PSSP6 B 56	PSSP6 B 108	PSSP6 B 88	PSSP6 B 93	PSSP6 B 86	PSSP6 B 90	PSSP6 B 110	PSSP6 B 103	PSSP6 B 102	PSSP6 B 111	ACTH7 B 4	PSSP6 B 101
	REP 1					REP 2					REP 3				

plots flagged for June 2011 field day

Accession	Species	Origin
Thurber needlegrass		
ACTH7 B1	<i>Achnatherum thurberianum</i>	Shrub Garden, Ada Co., ID
ACTH7 B2	<i>Achnatherum thurberianum</i>	Boise Foothills, Ada Co., ID
ACTH7 B3	<i>Achnatherum thurberianum</i>	Cedar Creek Reservoir, Twin Falls Co., ID
ACTH7 B4	<i>Achnatherum thurberianum</i>	Richland, Baker Co., OR
Bluebunch wheatgrass		
PSSP6 B86	<i>Pseudoroegneria spicata</i>	West of Lehi, Utah Co., UT
PSSP6 B88	<i>Pseudoroegneria spicata</i>	Antelope Island, Davis Co., UT
PSSP6 B89	<i>Pseudoroegneria spicata</i>	Antelope Island, Davis Co., UT
PSSP6 B90	<i>Pseudoroegneria spicata</i>	Boise, Ada Co., ID
PSSP6 B91	<i>Pseudoroegneria spicata</i>	Ontario, Malheur Co., OR
PSSP6 B93	<i>Pseudoroegneria spicata</i>	Powder River drainage, Baker/Union Co., OR
PSSP6 B101	<i>Pseudoroegneria spicata</i>	Darby, Ravalli Co., MT
PSSP6 B102	<i>Pseudoroegneria spicata</i>	Lone Pine, Clark Co., ID
PSSP6 B104	<i>Pseudoroegneria spicata</i>	Hamilton, Moffat Co., CO
PSSP6 B105	<i>Pseudoroegneria spicata</i>	Steamboat Springs, Routt Co., CO
PSSP6 B107	<i>Pseudoroegneria spicata</i>	Fort Collins, Larimer Co., CO
PSSP6 B108	<i>Pseudoroegneria spicata</i>	Eagle, Eagle Co., CO
PSSP6 B109	<i>Pseudoroegneria spicata</i>	Rifle, Garfield Co., CO
PSSP6 B110	<i>Pseudoroegneria spicata</i>	Cambridge, Washington Co., ID
PSSP6 B111	<i>Pseudoroegneria spicata</i>	Cambridge, Washington Co., ID
PSSP6 B114	<i>Pseudoroegneria spicata</i>	Oxbow Dam, Baker Co., OR
PSSP6 B115	<i>Pseudoroegneria spicata</i>	Richland, Baker Co., OR
PSSP6 B116	<i>Pseudoroegneria spicata</i>	Huntington, Baker Co., OR



Yarrow (*Achillea* spp.) Accessions

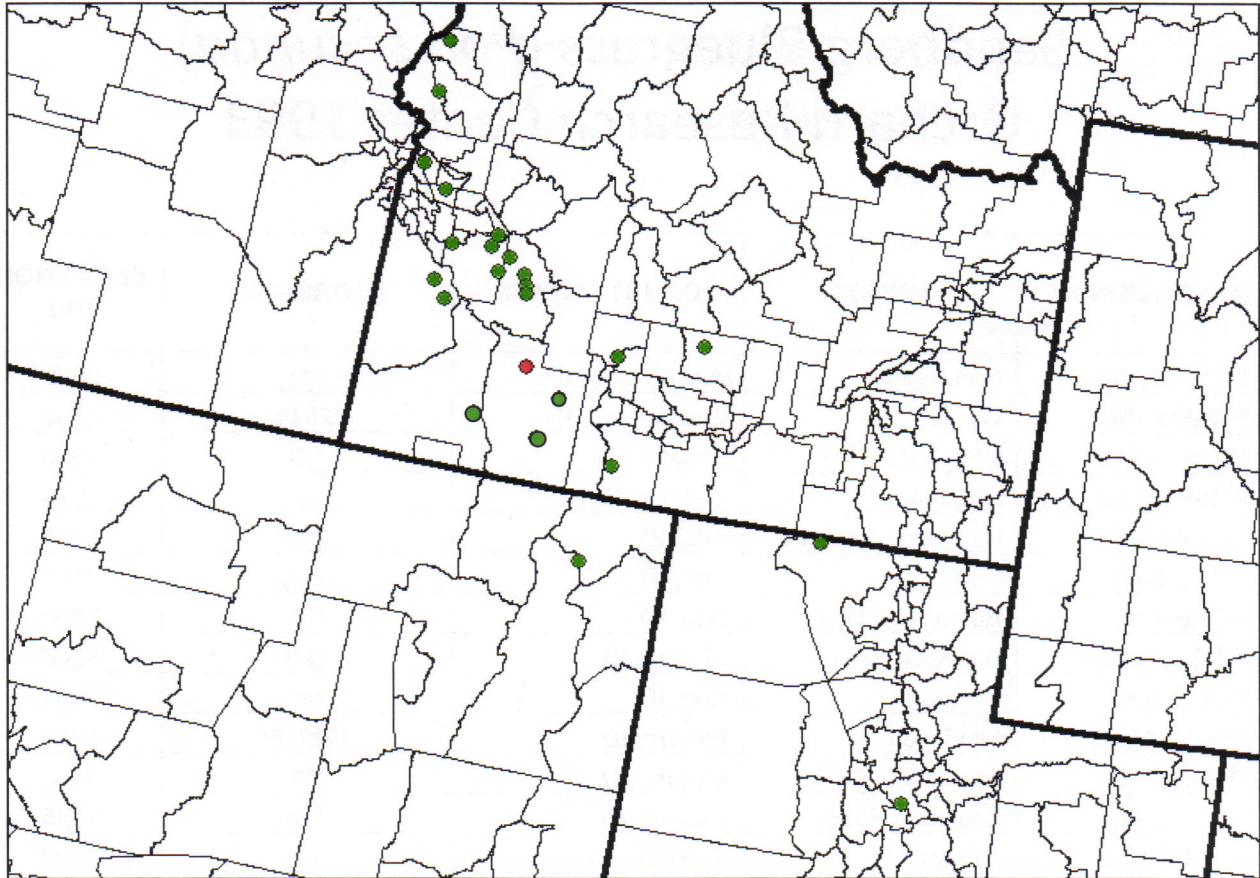
		15	16	17	18	19	20	21	22	Column*
Row*	01	ACMIC B4	ACSA B1	ACMI B38	ACCO B1	ACFI B1	ACMIL B29	ACSA B2		
	02	ACSpp B4	ACMIL B35	ACSA B2	ACMI B40	ACMIC B4	ACSU B1	ACSpp B3		
	03	ACMIL B31	ACFI B1	ACMIL B32	ACMI B43	ACMI B37	ACMIC B5	ACSpp B6		
	04	ACMI B36	ACNO B3	ACSpp B6	ACSA B1	ACMIL B34	ACMIL B28	ACMI B41		
	05	ACMI B43	ACMIL B33	ACMIL B28	ACSpp B3	ACMIL B32	ACMI B39	ACSpp B5	ACAS B1	
	06	ACMIL B30	ACSU B1	ACMI B37	ACMI B36	ACMIL B29	ACMIL B35	ACCO B1	ACNO B3	
	07		ACMIC B5	ACSpp B3	ACSA B2	ACMI B38	ACMI B40	ACMIL B34	ACMI B42	
	08		ACCO B1	ACMIL B29	ACMI B39	ACMI B41	ACAS B1	ACMIL B32	ACMIL B33	
	09		ACAS B1	ACMI B40	ACMIC B5	ACMIL B28	ACSpp B4	ACMI B36	ACMI B43	
	10		ACMI B42	ACMIL U10	ACMIL B30	ACSpp B5	ACNO B3	ACMI B38	ACSpp B4	
	11		ACMIL B34	ACMI B41	ACSpp B6	ACMIL B35	ACMI B42	ACMIL B30	ACMIL B31	
	12		ACSpp B5	ACMI B39	ACSU B1	ACMIL B33	ACMIL B31	ACMIC B4	ACSA B1	

* Plot number = Column number, row number

plots flagged for June 2011 field day

Accession	Plot numbers	Species	Common name	Origin
ACAS B1-87	1609, 2008, 2205	<i>Achillea asiatica</i>	Chinese yarrow	Iran
ACCO B1-87	1608, 1801, 2106	<i>A. conferta</i>	Bumadaran	Iran
ACFI B1-87	1603, 1901	<i>A. filipendulina</i>	Fernleaf yarrow	Iran
ACMIC B4-87	1501, 1902, 2112	<i>A. micrantha</i>	Levant yarrow	Soviet Union
ACMIC B5-87	1607, 1809, 2003	<i>A. micrantha</i>	Levant yarrow	Soviet Union
ACNO B3-87	1604, 2010, 2206	<i>A. nobilis</i>	Noble yarrow	Soviet Union
ACMIL B28-87	1705, 1909, 2004	<i>A. millifolium millifolium</i>	Common yarrow	Soviet Union
ACMIL B29-87	1708, 1906, 2001	<i>A. millifolium millifolium</i>	Common yarrow	Soviet Union
ACMIL B30-87	1506, 1810, 2111	<i>A. millifolium millifolium</i>	Common yarrow	Soviet Union
ACMIL B31-87	1503, 2012, 2211	<i>A. millifolium millifolium</i>	Common yarrow	Soviet Union
ACMIL B32-87	1703, 1905, 2108	<i>A. millifolium millifolium</i>	Common yarrow	Soviet Union
ACMIL B33-87	1605, 1912, 2208	<i>A. millifolium millifolium</i>	Common yarrow	Soviet Union
ACMIL B34-87	1611, 1904, 2107	<i>A. millifolium millifolium</i>	Common yarrow	Soviet Union
ACMIL B35-87	1602, 1911, 2006	<i>A. millifolium millifolium</i>	Common yarrow	Soviet Union
ACMI B36-88	1504, 1806, 2109	<i>A. millifolium occidentalis</i>	Western yarrow	Malad, Oneida Co., ID
ACMI B37-88	1706, 1903	<i>A. millifolium occidentalis</i>	Western yarrow	Eagle, Ada Co., ID
ACMI B38-88	1701, 1907, 2110	<i>A. millifolium occidentalis</i>	Western yarrow	Pittsburg Landing, Idaho Co., ID
ACMI B39-88	1712, 1808, 2005	<i>A. millifolium occidentalis</i>	Western yarrow	Hells Canyon, Adams Co., ID
ACMI B40-88	1709, 1802, 2007	<i>A. millifolium occidentalis</i>	Western yarrow	Brownlee Dam, Washington Co., ID
ACMI B41-88	1711, 1908, 2104	<i>A. millifolium occidentalis</i>	Western yarrow	Breadleaf Rock, Boise Co., ID
ACMI B42-88	1610, 2011, 2207	<i>A. millifolium occidentalis</i>	Western yarrow	Thistle, Utah Co., UT
ACMI B43-88	1505, 1803, 2209	<i>A. millifolium occidentalis</i>	Western yarrow	Fairview, Sanpete Co., UT
ACSA B1-87	1601, 1804, 2212	<i>A. santolina</i>	Santolina yarrow	Iran
ACSA B2-87	1702, 1807, 2101	<i>A. santolina</i>	Santolina yarrow	Iran
ACSU B1-87	1606, 1812, 2002	<i>A. sulfurea</i>	Antilebanon yarrow	Iran
ACSpp B3-87	1707, 1805, 2102	<i>Achillea</i> spp.	Yarrow	Iran
ACSpp B4-87	1502, 2009, 2210	<i>Achillea</i> spp.	Yarrow	Turkey
ACSpp B5-87	1612, 1910, 2105	<i>Achillea</i> spp.	Yarrow	Soviet Union
ACSpp B6-87	1704, 1811, 2103	<i>Achillea</i> spp.	Yarrow	Soviet Union

Sandberg Bluegrass (*Poa secunda*)



● Mountain Home Accession

● Sandberg bluegrass collection sites

Sandberg bluegrass is a perennial bunchgrass common to big sagebrush and salt desert communities of the Intermountain region. It provides excellent early spring herbage, soil protection and stability and slows the spread of annual weeds. It recovers well after fires and produces viable seeds even during years of drought. Common gardens were established in 1993 to determine whether distinct ecotypes existed and whether specific adaptive attributes might be identified. Development of commercial seed to restore extensive disturbances was dependent upon the selection of regionally adapted materials. Twenty-three accessions were planted at Orchard and at Nephi, Juab Co., Utah. Plants from more mesic areas were larger and remained greener longer in summer, while plants from drier areas were smaller and senesced earlier in the season. Seed from the U.S. Air Force Saylor Creek Range was selected as representative of accessions from the Snake River Plain. It has been in commercial production for several years and provides yields of 100 to 450 kg/ha dryland and 450 to 670 kg/ha with irrigation.

Products:

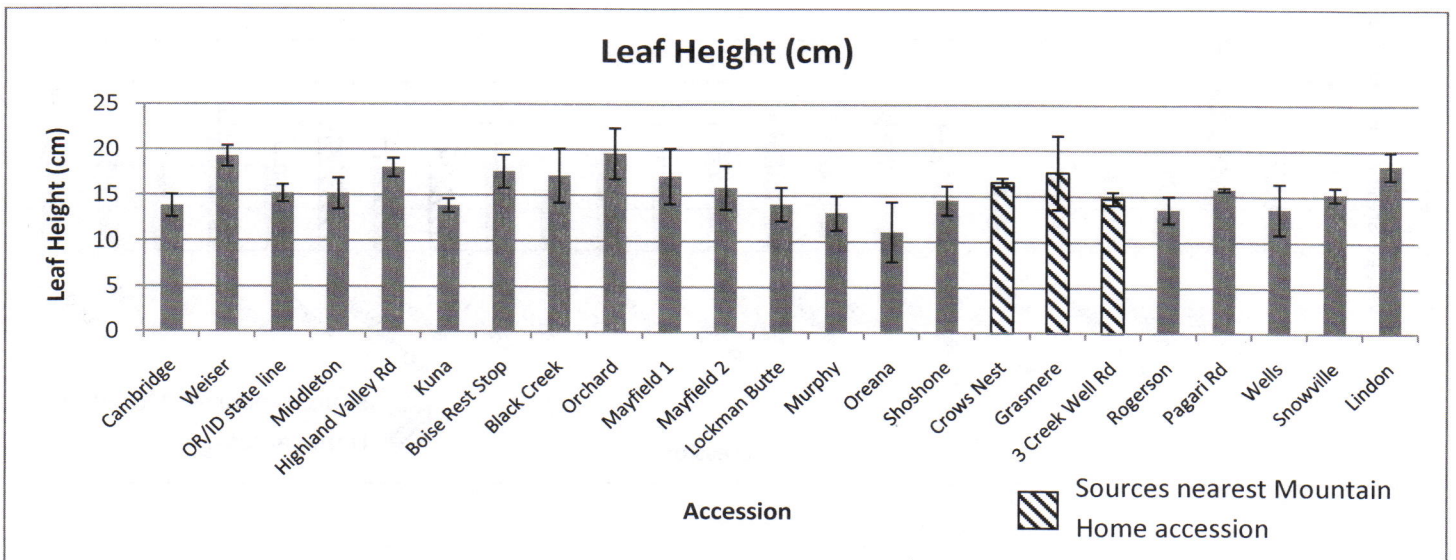
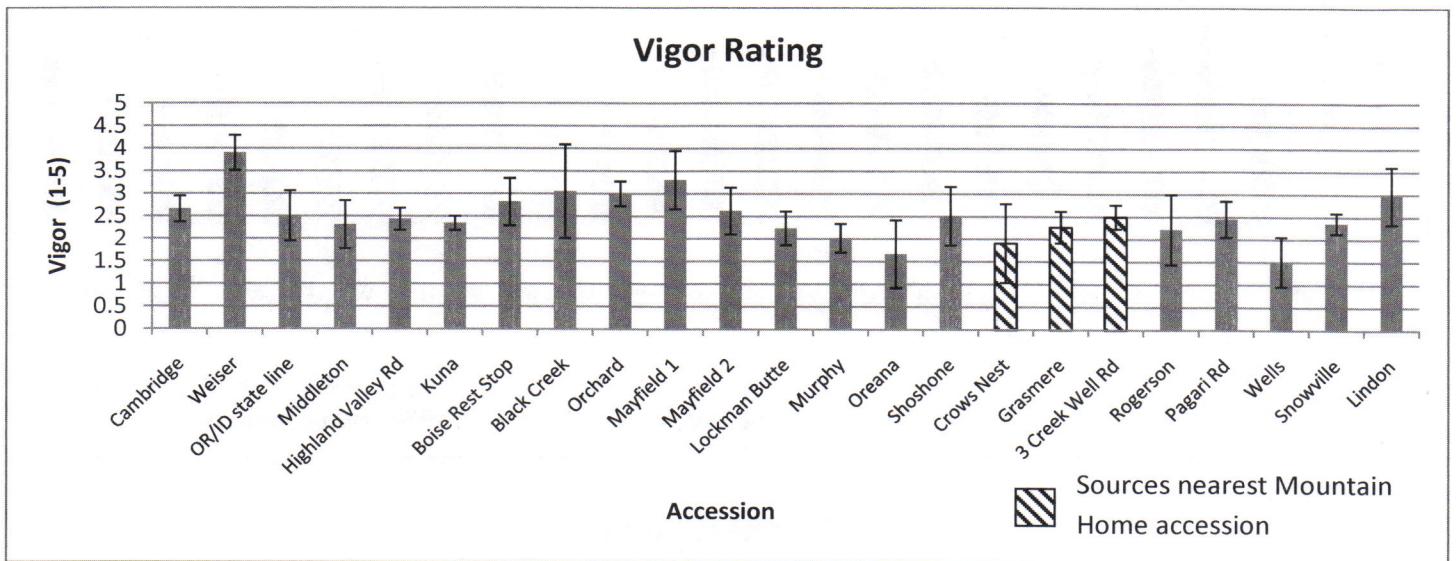
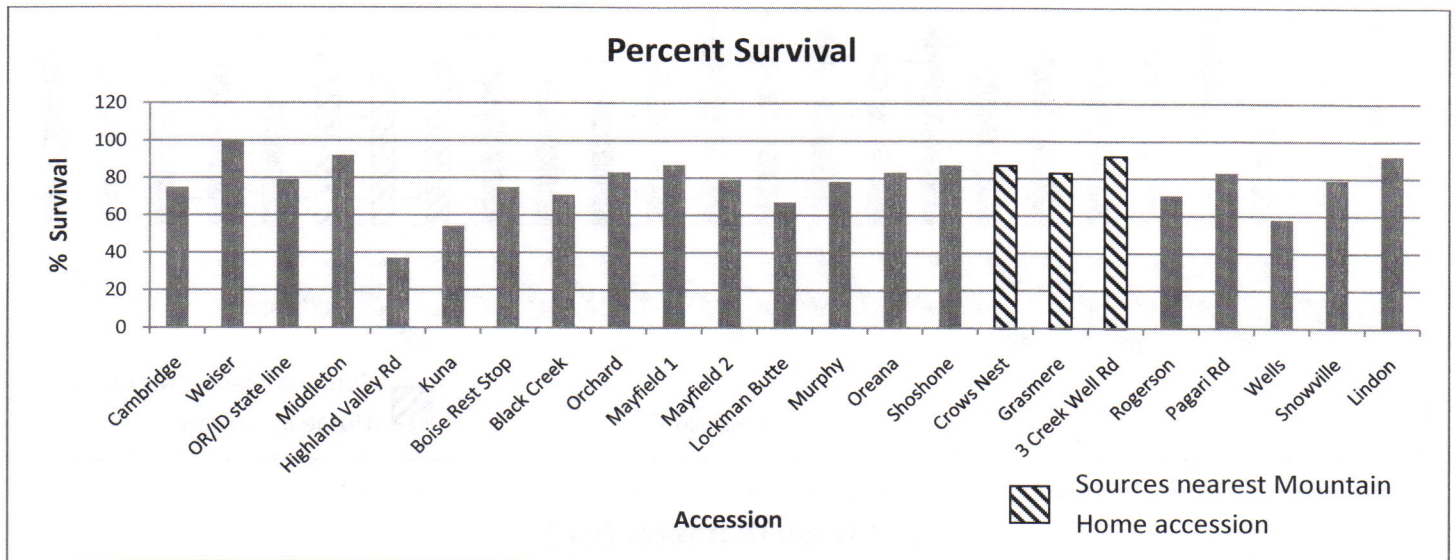
Notice of release for Mountain Home Germplasm Sandberg Bluegrass (Selected germplasm, natural track) U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 7 p. (Stock seed maintained by the Utah Crop Improvement Association, Logan, UT).
Submitted June 1011.

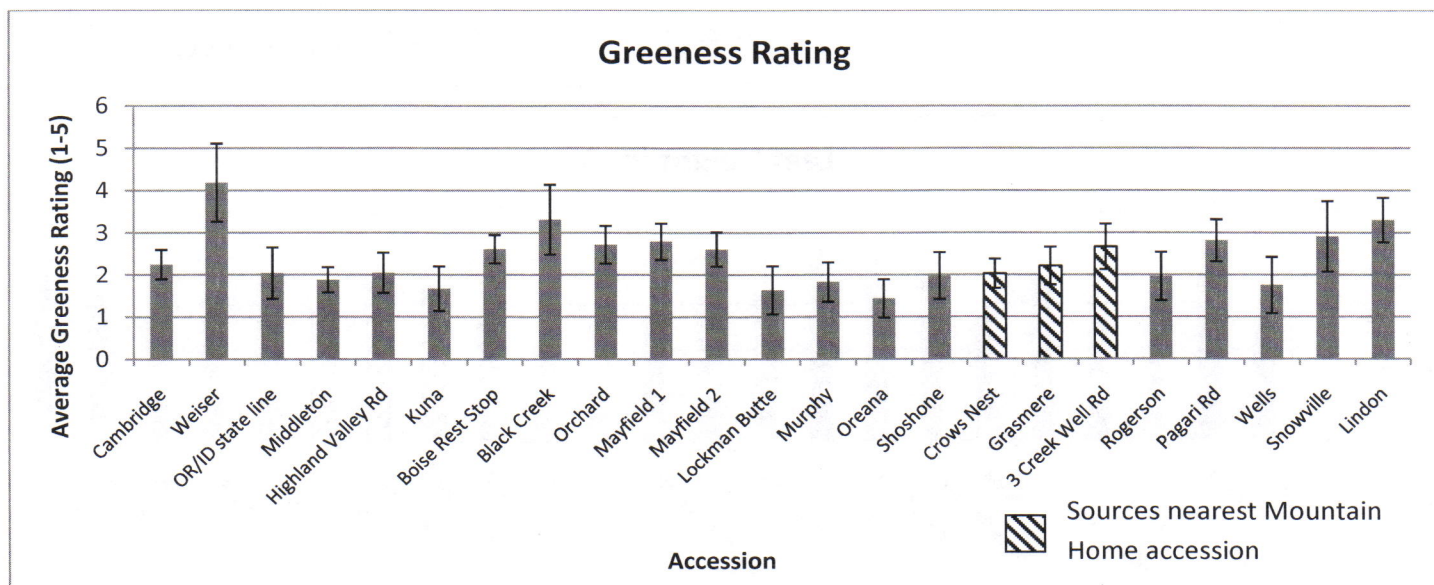
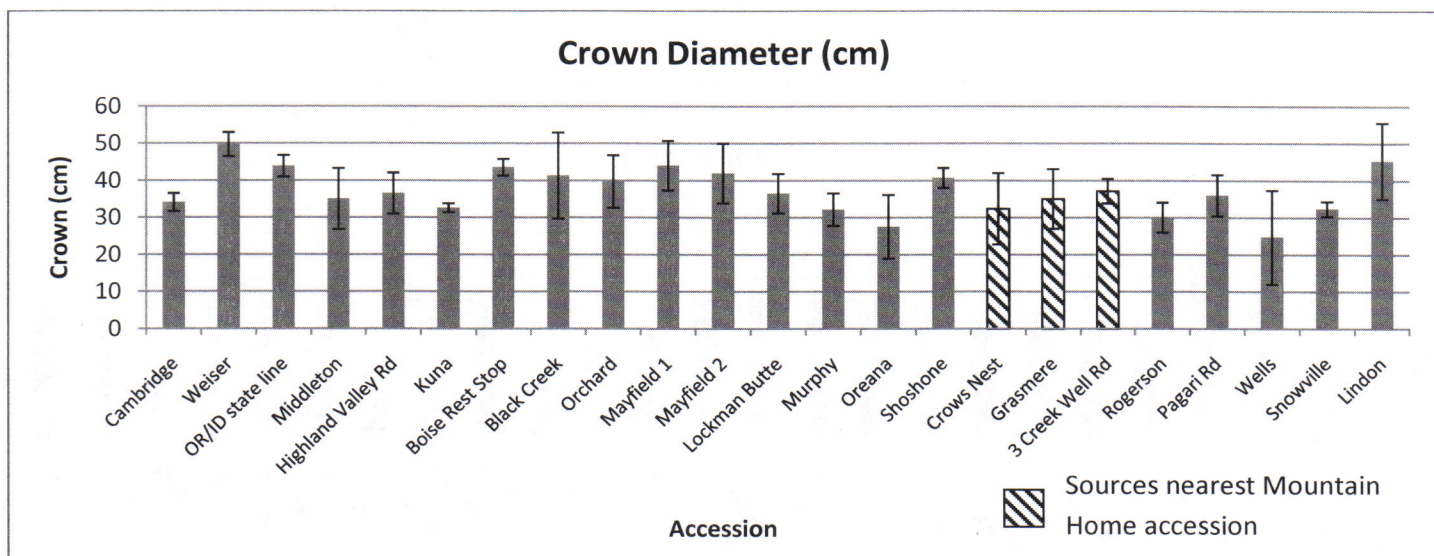
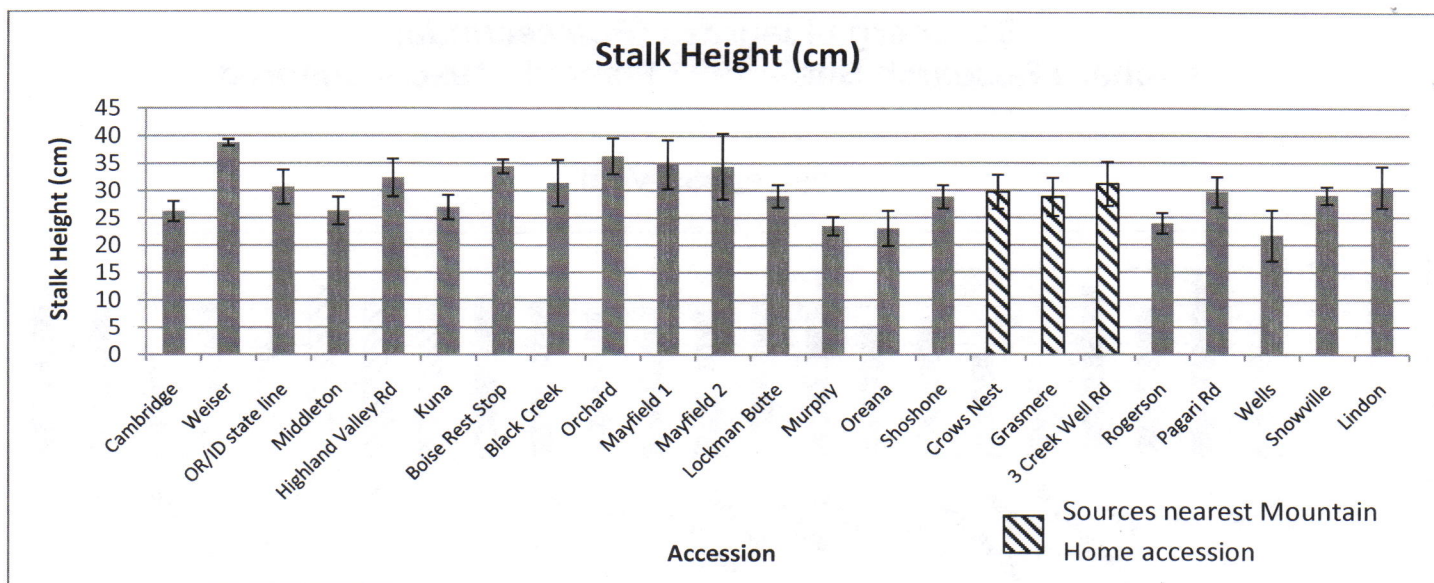
Sandberg Bluegrass (*Poa secunda*)

Orchard Research Center 1993

ACCESSION NO.	ORIGIN	COUNTY/STATE	ECOREGION	ELEVATION (ft.)
POSE 31-92	Cambridge	Washington, ID	11i	2300
POSE 29-92	Weiser	Washington, ID	12j/11i	3100
POSE 33-92	OR/ID state line	Payette, ID	12j	2300
POSE 26-92	Middleton	Canyon, ID	12j/a	2525
POSE 25-92	Highland Valley Rd	Ada, ID	16f	3200
POSE 5-90	Kuna	Ada, ID	12h/a	3100
POSE 7-90	Boise Rest Stop	Ada, ID	12h	2800
POSE 18-92	Black Creek	Elmore, ID	12h	3500
POSE 4-90	Orchard	Ada, ID	12h	3452
POSE 20-92	Mayfield 1	Elmore, ID	12h/16f	3650
POSE 21-92	Mayfield 2	Elmore, ID	12h	3600
POSE 3-90	Lockman Butte	Elmore, ID	12h	3145
POSE 23-92	Murphy	Owyhee, ID	12j	3400
POSE 34-92	Oreana	Owyhee, ID	12h	3000
POSE 39-92	Shoshone	Gooding, ID	12g/i	3500
POSE 15-92	Crows Nest	Owyhee, ID	80a	4200
POSE 36-92	Grasmere	Owyhee, ID	80a	5126
POSE 14-92	3 Creek Well Rd	Owyhee, ID	80a	5500
POSE 12-92	Rogerson	Twin Falls, ID	80a	5400
POSE 45-92	Pagari Rd	Lincoln, ID	12g/i	4400
POSE 47-92	Wells	Elko, NV	80a	5460
POSE 10-92	Snowville	Oneida, UT	13b	4600
POSE 8-91	Lindon	Utah, UT	13f	4800

Sandberg bluegrass (*Poa secunda*) **Orchard Research Site – 1993 Planted / 1996 Monitored**





IMPACTS OF NATIVE GRASSES AND CHEATGRASS ON GREAT BASIN FORB DEVELOPMENT

Hilary Parkinson
M.S. Thesis Abstract
Montana State University, Bozeman

Land managers need more information on native forb growth and interactions between forbs and grasses to improve degraded sagebrush steppe habitats in the Great Basin, and to increase the diversity of revegetation seed mixes. This is especially important in areas infested with *Bromus tectorum* (cheatgrass), an annual grass present in more than 100 million acres of the Great Basin. To gather information on forb growth and measure the effects of both native grasses and *B. tectorum* on forbs, I conducted a greenhouse experiment with 5 native forbs: *Lomatium* sp., *Eriogonum umbellatum*, *Machaeranthera canescens*, *Penstemon speciosus*, *Sphaeralcea munroana*; two native grasses: *Elymus elymoides* and *Poa sandbergii*; and *B. tectorum*. Forbs were grown alone or with a grass, and were harvested after 6, 9 or 12 weeks of growth. Excluding *Lomatium*, which became dormant before week 12, forbs did not differ in shoot relative growth rate when growing alone, but the root relative growth rate of *P. speciosus* was 50% greater. Neither native grass reduced the biomass of any forb, but growth rate was reduced for two forbs. In contrast, *B. tectorum* reduced the biomass and growth rates of all forbs, between 50 and 96%. In a second experiment, to test the ability of native forbs to establish and grow with *B. tectorum*, 4 forb species were grown in plots seeded with densities ranging from 45-360 *B. tectorum* plants m⁻² at two locations in the Snake River Plain. Water content declined with increasing densities of *B. tectorum* and forb seedling survival was reduced for 2 species when *B. tectorum* densities were greater than 150 plants m⁻². Reductions in forb biomass greater than 90% occurred for three species when *B. tectorum* densities were less than 100 plants m⁻². This study demonstrated that sites with low expected densities of *B. tectorum* should be selected when seeding forbs, but that native forbs can establish in sites with *B. tectorum* densities less than 150 plants m⁻², that native grasses and forbs can be used together in seed mixes, and that phenological and morphological characteristics can be used to optimize the diversity of seed mixes.

Publications:

Parkinson, Hilary A. 2008. Impacts of native grasses and cheatgrass on Great Basin forb development. Bozeman: Montana State University. 73 p. M.S. Thesis
Available online: http://www.fs.fed.us/rm/pubs_other/rmrs_2008_parkinson_h001.pdf

Parkinson, Hilary, Cathy Zabinski, and Nancy Shaw. Impacts of native grasses and cheatgrass (*Bromus tectorum*) on Great Basin forb seedling growth. Rangeland Ecology and Management. [Accepted].

WYOMING BIG SAGEBRUSH: EFFORTS TOWARDS DEVELOPMENT OF TARGET PLANTS FOR RESTORATION

Kayla R. Herriman
M.S. Thesis Abstract
University of Idaho, Moscow

Wyoming big sagebrush (*Artemisia tridentata* Nutt. ssp. *wyomingensis*) is a dominant shrub throughout much of the interior western United States. It is a key component of sagebrush steppe ecosystems, which have been degraded due to European settlement, improper land use, and changing fire regimes resulting from the invasion of exotic annual grasses. Re-establishment of this shrub has relied largely on direct seeding, but success has been erratic; outplanting nursery grown seedlings may be a more effective method of establishment. This study was initiated to identify the effect of three container types on Wyoming big sagebrush seedling morphology and physiological status in the nursery, and to link those characteristics to performance following outplanting. A second objective was to determine the influence of field fertilization on outplanted Wyoming big sagebrush seedling growth and survival. One-year-old seedlings were grown in three types of Styroblock™ (Beaver Plastics, Acheson, Alberta, Canada) containers: 45/340; 60/250; and 112/105 (the first number indicates the number of cavities in a block and the second indicates the volume of each cavity), and then outplanted on three southern Idaho sites in March 2008 and their morphology and physiological status were monitored until October 2008. Cold hardiness was measured at the end of the nursery growing season and immediately prior to outplanting; seedlings were most cold hardy at the end of the growing season (November and December) and still cold hardy, but to a lesser degree, prior to outplanting in March. Initially larger seedlings, grown in larger volume containers, maintained significantly greater height (105: 10.4 ± 0.11 cm, 250: 15.9 ± 0.18 cm, 340: 18.7 ± 0.21 cm) and root-collar diameter (105: 2.04 ± 0.02 mm, 250: 2.68 ± 0.02 mm, 340: 3.05 ± 0.03 mm) and tended to show superior growth over seedlings grown in smaller containers. Only at the driest site did container size have an influence on seedling survival, with 250 ($44\% \pm 0.04$) and 340 ($43\% \pm 0.04$) seedlings showing higher survivorship than 105 seedlings ($28\% \pm 0.04$). Fertilization negatively impacted seedling survival, potentially due to high soil salt concentration caused by the fertilizer; however where seedlings survived, there tended to be a benefit in above-ground growth. These results indicate that container type should be used as a management tool in conjunction with anticipated outplanting conditions, and that field fertilization may not provide a benefit to outplanted seedlings.

Publications:

Herriman, Kayla R. 2009. Wyoming big sagebrush: efforts toward development of target plants for restoration. Moscow: University of Idaho. 63 p. M.S. Thesis.

Available online: http://www.fs.fed.us/rm/pubs_other/rmrs_2009_herriman_k001.pdf

Herriman, Kayla R., Anthony S. Davis, and R. Kasten Dumroese. 2009. Influence of container size on Wyoming big sagebrush seedling morphology and cold hardiness. In: Dumroese, R.K.; Riley, L.E., tech. coords. 2009. National Proceedings: Forest and Conservation Nursery Associations—2008. Proc. RMRS-P-58. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 44–47. Online: http://www.fs.fed.us/rm/pubs/rmrs_p000.html.